

A stellar group

THE CREW OF STS-121 GEARS UP FOR ITS FANTASTIC VOYAGE

by Catherine E. Borsché

As the crew feverishly trains for their upcoming mission slated for later this year, one word comes to mind that sums up this elite team: explorers.

Meet the diverse group of astronauts who are going to continue our Return to Flight efforts with this second test flight.

STEVE LINDSEY Commander

Lindsey, a native of California, is no stranger to high-flying adventure.

As a colonel in the U.S. Air Force, Lindsey logged over 5,000 hours of flight time in more than 50 different types of aircraft.

Selected as an astronaut candidate in 1995, he has since flown on three different spaceflight missions: STS-87 (Nov. 19 to Dec. 5, 1997), STS-95 (Oct. 29 to Nov. 7, 1998) and STS-104 (July 12 to 24, 2001).

Lindsey, as commander of STS-121, will be looking to complete all the goals that were not completed during the first Return to Flight mission.

“As a test mission, our primary objectives are going to be to carry out all those test objectives that weren’t accomplished on STS-114, to take the lessons learned from STS-114 in terms of Return to Flight tests and apply them to our flight,” Lindsey said. “Hopefully, at the end of our mission, we’ll have everything done that needs to be done prior to going back into space station assembly on the flight after ours.”

Their mission will be an important stepping-stone to getting back to exploration endeavors, which Lindsey feels are invaluable to the space program.

“The reason we’re willing to take the risk is because the goal, exploration, is something we think is an inherent part of us,” Lindsey said. “What we learn from spaceflight far, far exceeds the risks in my opinion, so it’s worth doing.”

MARK KELLY Pilot

Kelly, like Lindsey, also has a military background. A commander in the U.S. Navy, Kelly has logged over 4,000 flight hours in more than 50 different aircraft and has over 375 carrier landings. He was also a member of Attack Squadron 115, based in Atsugi, Japan. While assigned to Attack Squadron 115, Kelly deployed twice to the Persian Gulf aboard the *USS Midway*. During his second deployment he flew 39 combat missions in Operation Desert Storm.

Kelly was selected as an astronaut in 1996. Having completed two years of training and evaluation, he is qualified for flight assignment as a pilot. He flew on STS-108 in 2001 and has logged almost 12 days in space.

With the astronauts’ heavy training schedule, a lot of personal sacrifice is

required to make this flight a success. But with sacrifice comes reward.

“It’s a big, very exciting adventure to get to make a trip into orbit. You look at it as a privilege,” Kelly said. “So you really decide that you’re going to put the time in and work really hard to get to the point where you’re ready.”



Astronaut Steven W. Lindsey, STS-121 commander, occupies the commander’s station during a mission training session in one of the high-fidelity trainers in the Space Vehicle Mockup Facility at JSC.



Astronaut Mark Kelly prepares for training at the Neutral Buoyancy Laboratory.

MIKE FOSSUM Mission Specialist

As a former U.S. Air Force test pilot, Fossam had a unique vantage point of the world. STS-121 will allow him to join the elite group of astronauts that has been able to look at the “blue marble” of Earth from space.

Fossam resigned from military active duty in 1992 to work for NASA, and is currently a colonel in the U.S. Air Force Reserves. He has logged over 1,000 hours in 34 different aircraft.

Fossam was selected as an astronaut in 1998 and has served in various positions at NASA, including as the Astronaut Office lead for space station flight software development. He supported several flights as a Capsule Communicator (CAPCOM) in Mission Control, including acting as lead CAPCOM for Expedition 6.

It takes a huge amount of teamwork to make a mission complete, and Fossam values the contributions made by his fellow astronauts and teammates in the trenches.

“There’s nothing I like more than to walk into a shop, without a crowd of people, and really talk to the people that are doing the work,” Fossam said. “Because, you know, this is not just a crew of seven that makes a shuttle fly. There are thousands of people that are lifting her up into the air on their shoulders, and I know that.”

LISA NOWAK Mission Specialist

Nowak, a commander in the U.S. Navy, has had some pretty amazing experiences before joining NASA.

Nowak has flown aircraft in small- and large-scale exercises with jamming and missile profiles for the Electronic Warfare Aggressor Squadron 34 at Point Mugu, Calif. In 1993, she was selected for both Aerospace Engineering Duty and U.S. Naval Test Pilot School. Nowak was assigned to Naval Air Systems Command, working on acquisition of new systems for naval aircraft, when she was selected for the astronaut program.

Selected as an astronaut in 1996, Nowak is now qualified as a mission specialist. Most recently, she served in the Astronaut Office Robotics Branch and in the CAPCOM

Branch, working in Mission Control as prime communicator with on-orbit crews.

STS-121 will be Nowak’s first spaceflight, and she is excited at the prospect.

“Probably the best part in the big picture is knowing that I am contributing to our space effort,” Nowak said. “From a personal point of view, I’ve just heard how wonderful the view is from up there. You can look at a picture and that’s one thing, but everybody’s told me that when you experience it yourself it’s something that you feel; it’s not something that you see. And I’m really looking forward to that.”

STEPHANIE WILSON Mission Specialist

Wilson’s unique background in space research will be invaluable for this mission.

While working at Martin Marietta Astronautics Group in Denver, Colo., she was responsible for performing coupled loads analyses for the launch vehicle and payloads during flight events. Later on, while attending graduate school at the University of Texas, her research focused on the control and modeling of large, flexible space structures. In 1992, Wilson went to the Jet Propulsion Laboratory in Pasadena, Calif., to work with the Attitude and Articulation Control Subsystem for the Galileo spacecraft. While there, she was a member of the Integrated Model Team, which was responsible for finite element modeling, controller design and software development.

Wilson reported to Johnson Space Center in 1996 and became trained as a mission specialist. She’s worked in both the Station and Shuttle Operations Branch in the Astronaut Office and has been a CAPCOM in Mission Control.



Astronaut Michael E. Fossum, STS-121 mission specialist, uses a climbing apparatus to lower himself from a simulated trouble-plagued shuttle in an emergency egress training session in the Space Vehicle Mockup Facility at JSC.



Astronauts Lisa M. Nowak (foreground) and Stephanie D. Wilson, STS-121 mission specialists, participate in a training session in the virtual reality lab at JSC.



Astronaut Stephanie D. Wilson, STS-121 mission specialist, participates in a simulation exercise using the Space Station Remote Manipulator System simulator in the Avionics Systems Laboratory at JSC.

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Stardust comet sample return amazes scientists

by Bill Jeffs

The world's first-ever cometary and interstellar dust particles captured by a spacecraft and returned to Earth have joined NASA's collection of astromaterials that includes lunar samples, solar wind atoms and meteorites.

NASA's Stardust capsule returned to Earth Jan. 15 at the Utah Test and Training Range. The capsule re-entered at nearly 29,000 mph—the highest velocity of any human-made object entering the Earth's atmosphere. The Stardust Sample Return Canister was flown to Ellington Field Jan. 17. Later that day, it was transported to the Stardust curatorial facility at the Johnson Space Center and opened to give scientists their first glimpse inside.

"The collection of cometary particles exceeded our expectations," said Donald Brownlee, Stardust principal investigator, University of Washington. "We were excited that the mission had gone well. The comet had to cooperate in providing the particles, and they had to be captured. We were absolutely thrilled to see many large impacts on the Aerogel."

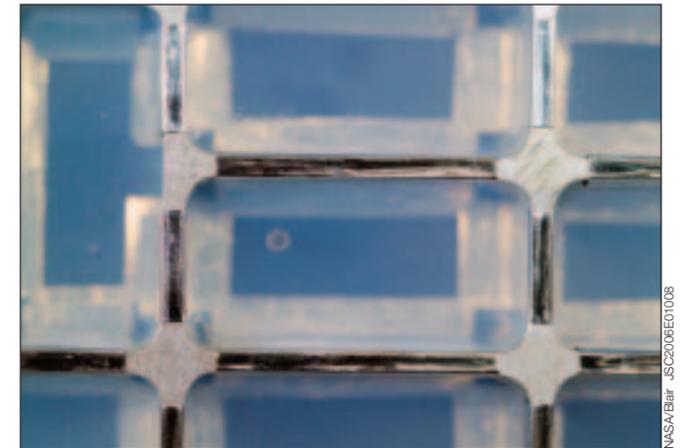
Inside the canister, a tennis racket-like sample collector tray holds the particles captured in silica aerogel as the spacecraft flew within 149 miles of comet Wild 2 in January 2004. An opposite side of the tray holds interstellar dust particles caught streaming through the solar system by Stardust during its seven-year, 3-billion-mile journey.

Scientists believe these cometary particles are the pristine remains of the material that formed the planets some 4.6 billion years ago. Comets are believed to be the well-preserved remnants of the primitive bodies at the formation of the solar system, possibly composed of some of the basic building blocks of life. In their investigations of the returned samples, scientists expect to find evidence that comets may have brought water to the Earth, making life possible.

"Now, we can bring to the people of Earth a unique glimpse of the beginning of our solar system," said Peter Tsou, Stardust deputy principal investigator, Jet Propulsion Lab. "Tiny samples from a distant comet can open giant windows to our past."

Much of Stardust's success depended upon Tsou's proposal to use Aerogel, the world's lowest density solid, to trap the planetary particles streaming through space faster than a rifle bullet. Blocks of the smoky looking foam filled the aluminum tray assembly that was extended from the Stardust spacecraft during the collection phases of the mission.

"I had warned the team we might not be able to see tracks with the naked eye and not to be disappointed," Brownlee said.



Closeup view of cometary impact (center) into Aerogel which was inspected by scientists at a laboratory at JSC hours after the Stardust Sample Return Canister was delivered to the space center from the spacecraft's landing site in Utah.



Mike Zolensky (left), Stardust curator and co-investigator, and Donald Brownlee, principal investigator with the University of Washington, study Stardust material after its canister is opened in a laboratory at JSC.

Scientists were elated to see numerous easy-to-see tracks, including at least one large enough to poke a little finger in. They were thrilled to see tracks with the unaided eye while standing a few feet away from the collector.

Wilson knows that this shuttle mission and the ones that follow will play a large role in preparing NASA for the future.

"I believe the role of STS-121, as with the subsequent shuttle missions, will be to complete our phase of low-Earth orbit," Wilson said. "We will not be going to the moon or Mars during this phase, but we certainly have learned a great deal about re-engineering and redesigning our systems, about upgrading our processes for developing or maintaining our vehicles here on the ground and interfacing with Mission Control."

PIERS SELLERS Mission Specialist

Sellers is probably the most well-traveled member of the STS-121 crew.

Before joining the astronaut corps, Sellers researched how the Earth's biosphere and atmosphere interact. His work involved computer modeling of the climate system, satellite remote-sensing studies and field work using aircraft, satellites and ground teams in places such as Kansas, Russia, Africa, Canada and Brazil.

Sellers was selected to be an astronaut in 1996. Initially, he was assigned technical duties in the Astronaut Office Computer Support Branch, followed by service in the Astronaut Office Space Station Branch. During this time, he also worked part-time in Moscow as a technical liaison on International Space Station computer software.

Sellers is a veteran of one spaceflight, STS-112. During that mission, he logged over 252 hours in space, including almost 20 spacewalk hours in three spacewalks.

Sellers received much of his inspiration to be an astronaut from the earlier astronauts.

"I watched all that stuff on TV when I was a kid, all the lunar landings, Skylab, early shuttle," Sellers said. And of those powerful images locked in his memory, he finds them simply "mesmerizing."

THOMAS REITER Mission Specialist

Reiter will be going up with STS-121, but he's getting a different ticket punched for the ride home.

Reiter will join Expedition 13 under a commercial agreement between the European Space Agency (ESA) and Roscosmos. When he arrives at the station, the crew will be made up of three people for the first time since May 2003.

Reiter, who flew for six months on the Russian space station Mir, will be the first non-American or non-Russian long-duration crewmember on the station. He will return to Earth aboard either shuttle mission STS-116 or a Russian Soyuz.

A native of Germany, Reiter has been very active within ESA since 1992. In 1995, he was assigned as onboard engineer for the Euromir 95 mission and spent a record-breaking 179 days in space, completing two spacewalks.

Between October 1996 and July 1997, Reiter underwent training on Soyuz-TM spacecraft operations for de-docking, atmospheric

reentry and landing. He was awarded the Russian "Soyuz Return Commander" certificate, which qualifies him to command a three-person Soyuz capsule during its return from space. Later, he

participated in an International Space Station advanced training class to prepare for the first European long-term flight aboard the station.



Astronaut Piers J. Sellers, STS-121 mission specialist, attired in a training version of the Extravehicular Mobility Unit space suit, is about to begin a training session in the Neutral Buoyancy Laboratory near the JSC.



European Space Agency (ESA) astronaut Thomas Reiter (left) of Germany, astronauts Piers J. Sellers and Stephanie D. Wilson, both STS-121 mission specialists, participate in a training session in one of the full-scale trainers in the Space Vehicle Mockup Facility at the JSC.

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Steve Lindsey, STS-121 Commander